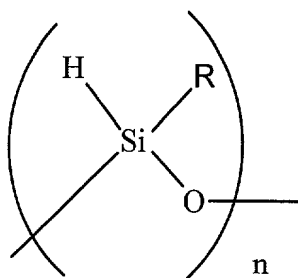


WHAT IS CLAIMED IS:

- 1            1.        A method for improving the fray resistance of a suture comprising  
2        at least one filament, the method comprising:  
3                    applying a coating to at least a portion of a surface of the at least  
4        one filament of the suture by a plasma polymerization process of a  
5        hydrocyclosiloxane monomer of the general formula



- 6  
7        where R is an aliphatic group and n is an integer from 2 to about 10, preferably 4  
8        to 6.

- 1            2.        The method according to claim 1 wherein the hydrocyclosiloxane  
2        monomer is selected from the group consisting of 1,3,5,7-  
3        tetramethylcyclotetrasiloxane; 1,3,5,7,9-pentamethylhydrocyclopentasiloxane;  
4        1,3,5,7,9,11-hexamethylhydrocyclohexasiloxane and a mixture of 1,3,5,7,9-  
5        pentamethylcyclopentasiloxane and 1,3,5,6,9,11-hexamethylcyclohexasiloxane  
6        monomers.

- 1            3.        The method according to claim 1 wherein the coating further  
2        comprises an amine group that has been introduced onto the coating by plasma

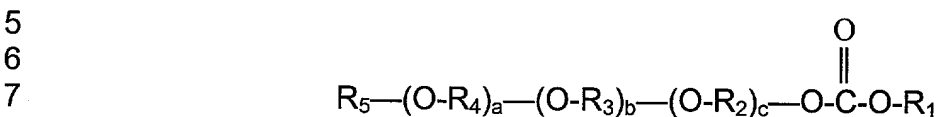
3 polymerization of a gas containing a monomer selected from the group consisting  
4 essentially of unsaturated N-protected amines, unsaturated N-unprotected  
5 amines, N-protected cyclic aliphatic amines, and N-unprotected cyclic aliphatic  
6 amines, to produce an amine grafted polymer coating.

1 4. The method according to claim 3 wherein the unsaturated or  
2 cyclic amine is copolymerized with the hydrocyclosiloxane monomer onto the  
3 surface of the at least one filament of the suture.

1 5. The method according to claim 3 wherein the unsaturated or  
2 cyclic amine is plasma grafted onto the coating on the surface of the at least one  
3 filament of the suture.

1 6. The method according to claim 3 wherein said unsaturated or  
2 cyclic amine is N-trimethylsilylallylamine.

1 7. The method according to claim 3 wherein a carbonate-based  
2 polyalkylene oxide compound is contacted with the amine grafted polymer  
3 coating to produce a polyoxyalkylene modified polymer coating, the carbonate-  
4 based polyalkylene oxide compound comprising the general formula

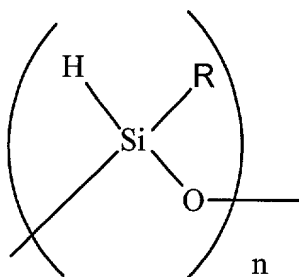


8 wherein R<sub>1</sub> is selected from an N-benzotriazole group, an N-2-pyrrolidinone  
9 group, or a 2-oxypyrimidine group; R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are independently selected  
10 alkylene groups of about 2 to about 3 carbon atoms and may be the same or  
11 different; R<sub>5</sub> is selected from hydrogen, methyl, a carbonyloxy-N-benzotriazole  
12 group, a carbonyloxy-N-2-pyrrolidinone group, and a carbonyl-2-oxypyrimidine  
13 group; a is an integer from 1 to 1000 and each of b and c is an integer from 0 to  
14 1000, where a+b+c is an integer from 3 to 1000.

1 8. The method according to claim 7 wherein said carbonate-based  
2 polyalkylene oxide compound is polyoxyethylene bis-(N-hydroxybenzotriazolyl)  
3 carbonate.

1 9. The method of claim 1 wherein the suture comprises at least one  
2 polypropylene fiber.

1 10. A method for making a coated suture comprising :  
2 providing a suture comprising at least one filament having a  
3 surface; and  
4 applying a coating to at least a portion of the surface of the at least  
5 one filament of the suture by a plasma polymerization process of a  
6 hydrocyclosiloxane monomer of the general formula



7

8 where R is an aliphatic group and n is an integer from 2 to about 10, preferably 4  
9 to 6.

1 11. The method according to claim 10 wherein the hydrocyclosiloxane  
2 monomer is selected from the group consisting of 1,3,5,7-  
3 tetramethylcyclotetrasiloxane; 1,3,5,7,9-pentamethylhydrocyclopentasiloxane;  
4 1,3,5,7,9,11-hexamethylhydrocyclohexasiloxane and a mixture of 1,3,5,7,9-  
5 pentamethylcyclopentasiloxane and 1,3,5,6,9,11-hexamethylcyclohexasiloxane  
6 monomers.

1 12. The method according to claim 10 wherein the coating further  
2 comprises an amine group that has been introduced onto the coating by plasma  
3 polymerization of a gas containing a monomer selected from the group consisting  
4 essentially of unsaturated N-protected amines, unsaturated N-unprotected  
5 amines, N-protected cyclic aliphatic amines, and N-unprotected cyclic aliphatic  
6 amines, to produce an amine grafted polymer coating.

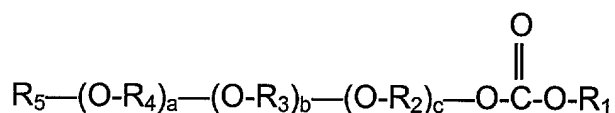
1 13. The method according to claim 12 wherein the unsaturated or

2 cyclic amine is copolymerized with the hydrocyclosiloxane monomer onto the  
3 surface of the at least one filament of the suture.

1 14. The method according to claim 12 wherein the unsaturated or  
2 cyclic amine is plasma grafted onto the coating on the surface of the at least one  
3 filament of the suture.

1 15. The method according to claim 12 wherein said unsaturated or  
2 cyclic amine is N-trimethylsilylallylamine.

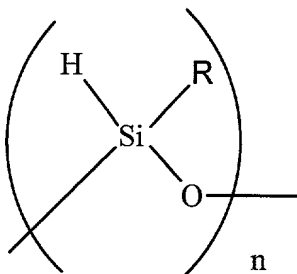
1 16. The method according to claim 12 wherein a carbonate-based  
2 polyalkylene oxide compound is contacted with the amine grafted polymer  
3 coating to produce a polyoxyalkylene modified polymer coating, the carbonate-  
4 based polyalkylene oxide compound comprising the general formula



8 wherein R<sub>1</sub> is selected from an N-benzotriazole group, an N-2-pyrrolidinone  
9 group, or a 2-oxypyrimidine group; R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are independently selected  
10 alkylene groups of about 2 to about 3 carbon atoms and may be the same or  
11 different; R<sub>5</sub> is selected from hydrogen, methyl, a carbonyloxy-N-benzotriazole  
12 group, a carbonyloxy-N-2-pyrrolidinone group, and a carbonyl-2-oxypyrimidine  
13 group; a is an integer from 1 to 1000 and each of b and c is an integer from 0 to  
14 1000, where a+b+c is an integer from 3 to 1000.

1            17.    The method according to claim 16 wherein said carbonate-based  
2 polyalkylene oxide compound is polyoxyethylene bis-(N-hydroxybenzotriazolyl)  
3 carbonate.

1            18.    A suture comprising:  
2                    at least one filament; and  
3                    a coating formed on at least a portion of a surface of the at least  
4 one filament by a plasma polymerization process wherein a polymer coating is  
5 formed on the filament surface from a hydrocyclosiloxane monomer of the  
6 general formula



7  
8            where R is an aliphatic group and n is an integer from 2 to about 10, preferably 4  
9            to 6.

1            19.    A suture according to claim 18 wherein the hydrocyclosiloxane  
2 monomer is selected from the group consisting of 1,3,5,7-  
3 tetramethylcyclotetrasiloxane; 1,3,5,7,9-pentamethylhydrocyclopentasiloxane;  
4 1,3,5,7,9,11-hexamethylhydrocyclohexasiloxane and a mixture of 1,3,5,7,9-

5 pentamethylcyclopentasiloxane and 1,3,5,6,9,11-hexamethylcyclohexasiloxane  
6 monomers.

1 20. A suture according to claim 18 wherein the at least one filament is  
2 made from a synthetic, absorbable polymer composition.

1 21. A suture according to claim 18 wherein the at least one filament is  
2 made from a synthetic, non-absorbable polymer composition.

1 22. A suture according to claim 21 wherein the synthetic, non-  
2 absorbable polymer composition comprises one or more materials selected from  
3 the group consisting of nylon and polypropylene.

1 23. A suture according to claim 20 wherein the synthetic, absorbable  
2 polymer composition comprises a homopolymer or copolymer derived from one  
3 or more monomers selected from the group consisting of glycolic acid, glycolide,  
4 lactic acid, lactide, dioxanone, caprolactone, polycaprolactone, epsilon-  
5 caprolactone, trimethylene carbonate.

1 24. The suture of claim 18 wherein the coating further comprises an  
2 amine group that has been introduced onto the coating by plasma polymerization  
3 of a gas containing a monomer selected from the group consisting essentially of  
4 unsaturated N-protected amines, unsaturated N-unprotected amines, N-

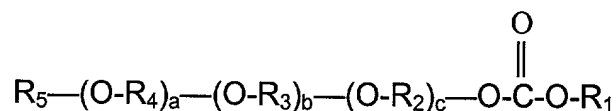
5 protected cyclic aliphatic amines, and N-unprotected cyclic aliphatic amines, to  
6 produce an amine grafted polymer coating.

1 25. The suture of claim 24 wherein the unsaturated or  
2 cyclic amine is copolymerized with the hydrocyclosiloxane monomer onto the  
3 surface of the at least one filament of the suture.

1 26. The suture of claim 24 wherein the unsaturated or  
2 cyclic amine is plasma grafted onto the coating on the surface of the at least one  
3 filament of the suture.

1 27. The suture of claim 24 wherein said unsaturated or cyclic amine is  
2 N-trimethylsilylallylamine.

1 28. The suture of claim 24 wherein a carbonate-based polyalkylene  
2 oxide compound is contacted with the amine grafted polymer coating to produce  
3 a polyoxyalkylene modified polymer coating, the carbonate-based polyalkylene  
4 oxide compound comprising the general formula



8 wherein R<sub>1</sub> is selected from an N-benzotriazole group, an N-2-pyrrolidinone  
9 group, or a 2-oxypyrimidine group; R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are independently selected  
10 alkylene groups of about 2 to about 3 carbon atoms and may be the same or



11 different;  $R_5$  is selected from hydrogen, methyl, a carbonyloxy-N-benzotriazole  
12 group, a carbonyloxy-N-2-pyrrolidinone group, and a carbonyl-2-oxypyrimidine  
13 group; a is an integer from 1 to 1000 and each of b and c is an integer from 0 to  
14 1000, where  $a+b+c$  is an integer from 3 to 1000.

1 29. The suture of claim 28 wherein said carbonate-based polyalkylene  
2 oxide compound is polyoxyethylene bis-(N-hydroxybenzotriazolyl) carbonate.